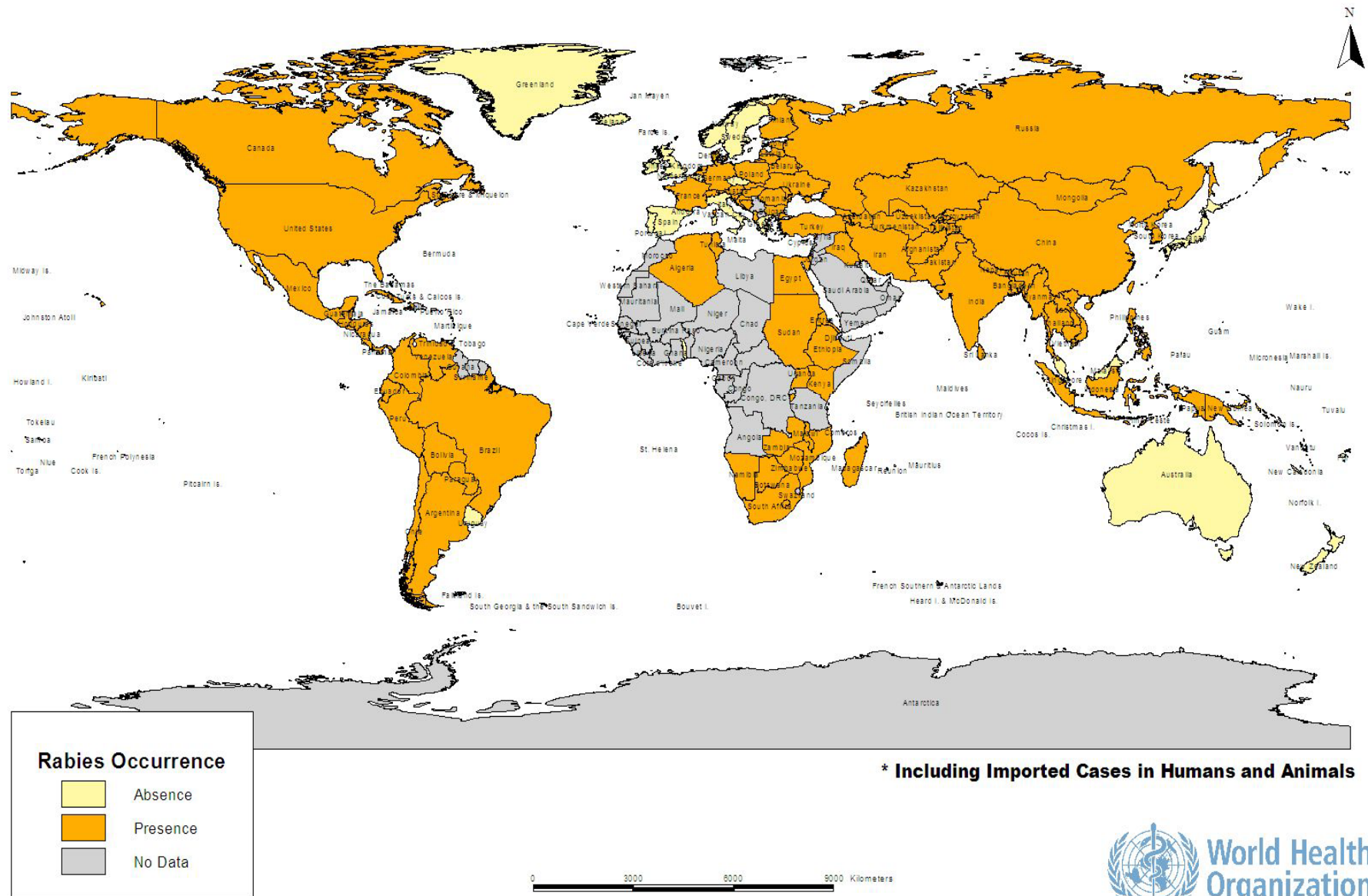


# **Rabies epidemiology, disease burden and vaccine utilization in Asia**

Mary Elizabeth Miranda, DVM

Philippines

# Presence / Absence of Rabies\* Worldwide - 2003



Note : The boundaries and names shown and the designations used in this map do not imply official endorsement by the United Nations.

# RABIES in ASIA

**Over 30,000 die every year**



San Lazaro Hospital, Department of Health, PHILIPPINES

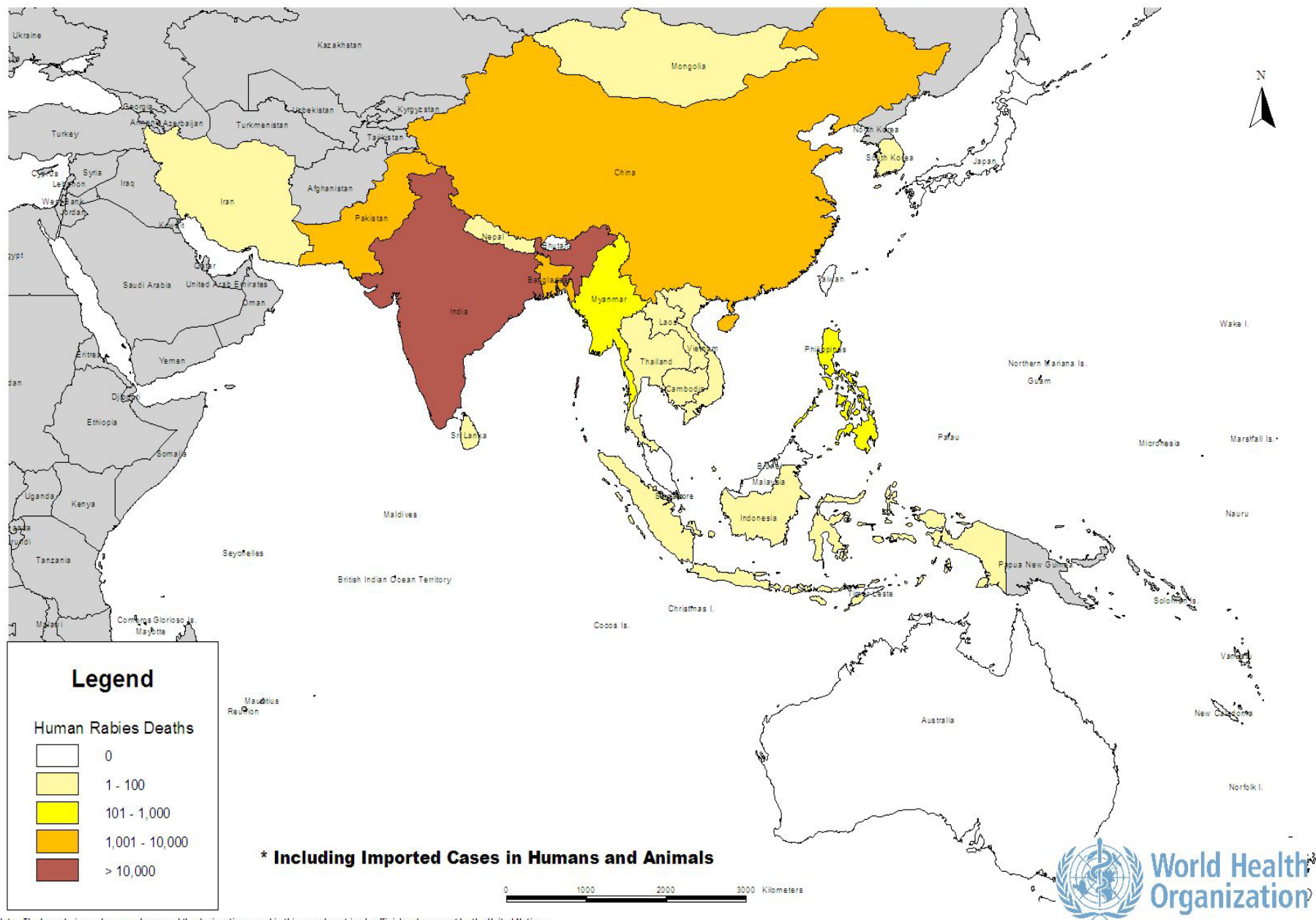
# RABIES in ASIA

One Asian dies every 15 minutes,  
50% likely to be a child under 15 years

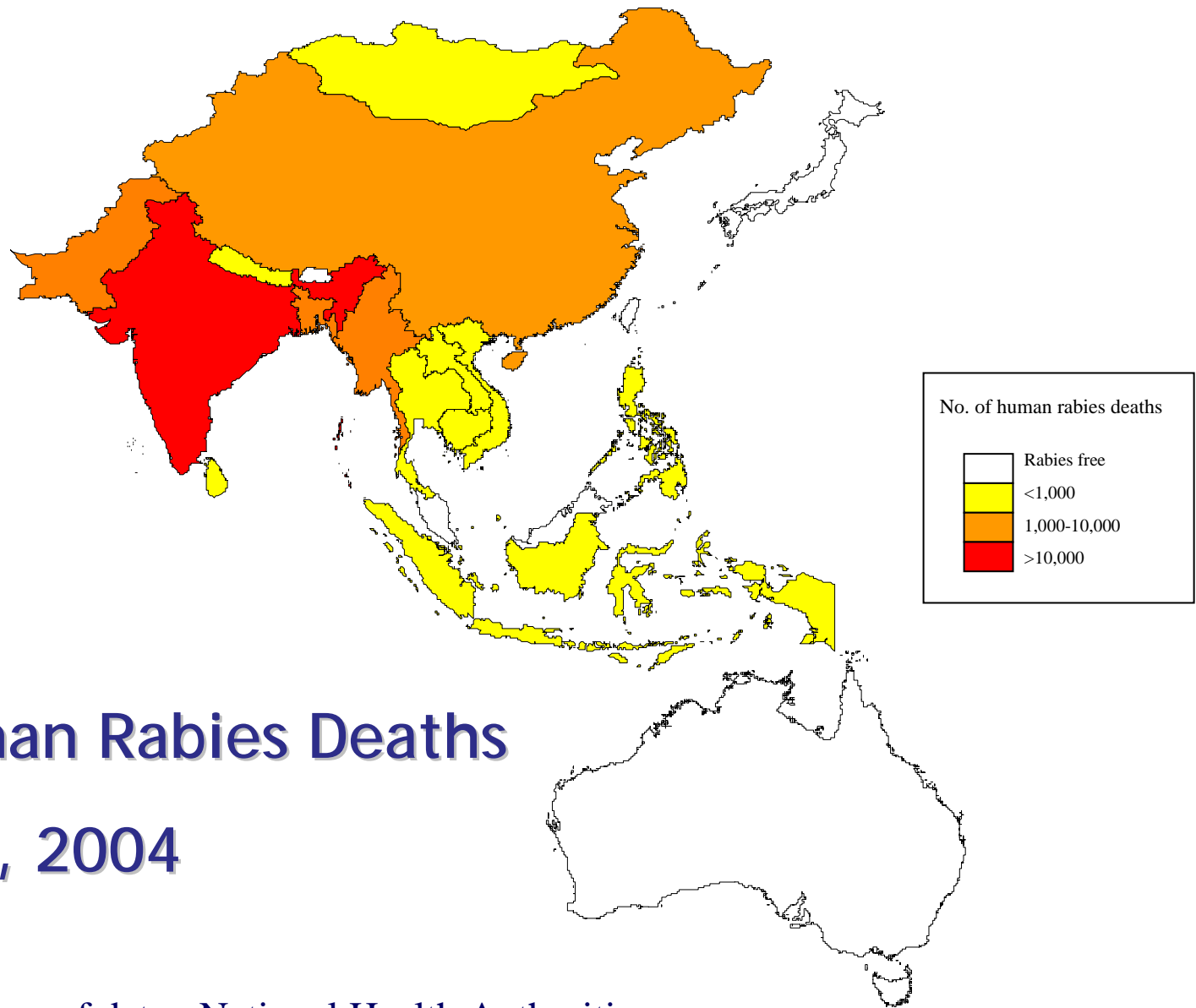


San Lazaro Hospital, Department of Health, PHILIPPINES

# Human Rabies Deaths - 2003



Note: The boundaries and names shown and the designations used in this map do not imply official endorsement by the United Nations.



## Human Rabies Deaths

Asia, 2004

Source of data: National Health Authorities





More than 3 billion people in developing countries  
in Asia potentially exposed to dog rabies

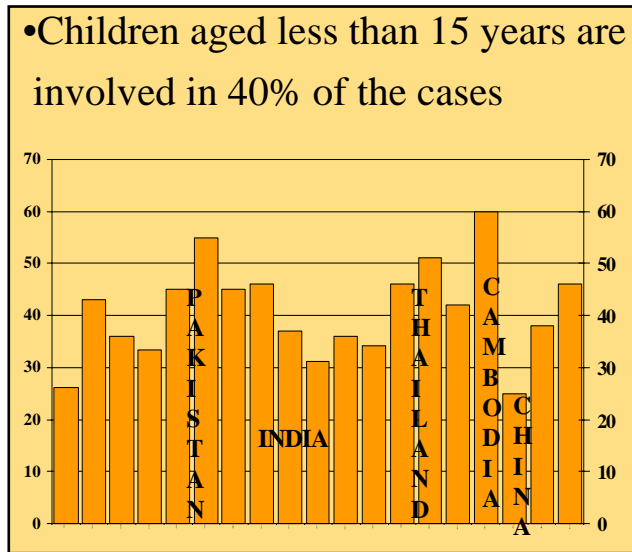
# Rabies exposures

98% of deaths come from bites of rabid dog;  
mostly children who come face to face with them



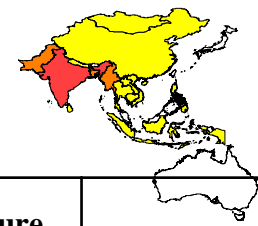


# Rabies: a disease of childhood



Rabies a disease of neglected populations (rural & poor communities)

# Human Rabies and Treatments, Asia, 2004



Country	Deaths	Rate/million	Post-exposure Treatment	Rate/mil
India	17,000	16.7	1,800,000	1,768
Pakistan	2,490	17	69,000	469
Bangladesh	1,550	12	60,000	455
Myanmar	1,100	23	5,000	102
China	2009	1.6	5,000,000	3,959
Philippines	248	3.3	102,148	1,338
Indonesia	40	0.2	8,800	43
Sri Lanka	76	4	80,000	4,200
Thailand	26	0.41	200,000	3,178
Vietnam	30	0.38	635,000	8,105
Nepal	44	2.17	25,000	1,085
Cambodia	2	0.80	12,000	1,071
Lao People s Democratic Republic	2	1.26	3,000	540
Mongolia	2	0.80	62	25
<b>TOTAL</b>	<b>24,609</b>	<b>6.5</b>	<b>7,692,010</b>	<b>1,881</b>

Source: WHO World Survey of Rabies (RABNET online - [www.who.int/rabnet](http://www.who.int/rabnet))

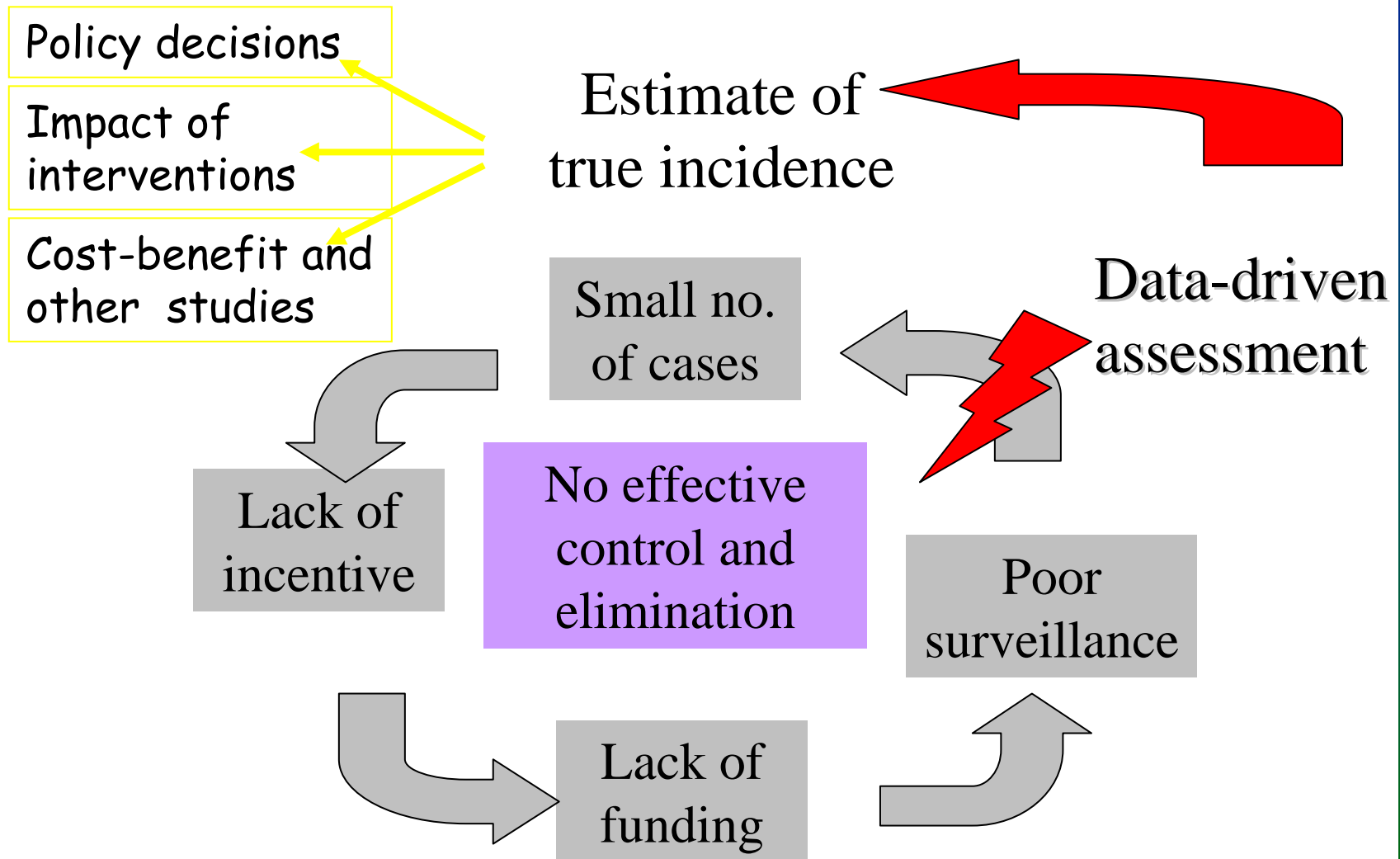
# Post-exposure treatments in Asia

- Over 10M post-exposure treatments annually
- 70 % of worldwide PET
- Majority still receive the nerve tissue derived rabies vaccine



800 post-exposure treatments every hour

# Break "circle of neglect": ignorance-complacency





# Need for a better rabies burden assessment:

WHO initiated work for the development of a global model for the re-assessment of rabies public health and economic burden in Africa and Asia.

We used the model developed by S. Cleaveland

Main parameters driving the model are

- Annual incidence of suspect rabid dog bites
- 'Rabies recognition probability' P1
- Probability of receiving successful post-exposure treatment P10

- Each parameter: a variable for which we have defined their is a minimum, a likely and a maximum value. Or a point probability
- For incidence of dog bites: from 10 to 250 per 100 000 most likely 100
- For P1: 39% to 64% most likely 50%
- For P10: 55% to 100% most likely 60 to 80%

# Global outputs - deaths

## ■ Urban

- India = 1,058
- China = 1,324
- Other Asia = 853
- Africa = 5,886

Urban:  
9000: 16%

## • Rural

- India = 18,201
- China = 1,257
- Other Asia = 8,135
- Africa = 17,937

Rural:  
46000: 84%

# Global outputs:

Human Deaths: 55 000

Total Asia: 31 000 (56% of total)

9 over 10 deaths in rural areas

Total Africa: 24 000 (44% of total)

3 over 4 deaths in rural areas

# Presence / Absence of Rabies\* Worldwide - 2003

North America and Europe  
<50 deaths < 100 000 PEP

Middle and Near  
East  
<100  
<100 000 PEP

Latin America  
<40 deaths  
< 500 000 PEP

**Africa**  
**24000 deaths**  
**< 500 000 PEP**

**Asia**  
**31 000 deaths**  
**>8000 000 PEP**

Rabies C  
Presence  
No Data

0 3000 6000 9000 Kilometers

Note : The boundaries and names shown and the designations used in this map do not imply official endorsement by the United Nations.



# Global outputs:

Cost burden: \$580 millions

Total Asia: 560 (96,5%)

Total Africa: 20 (3.5%)

# DALY\* scores

- DALY score (rabies death):

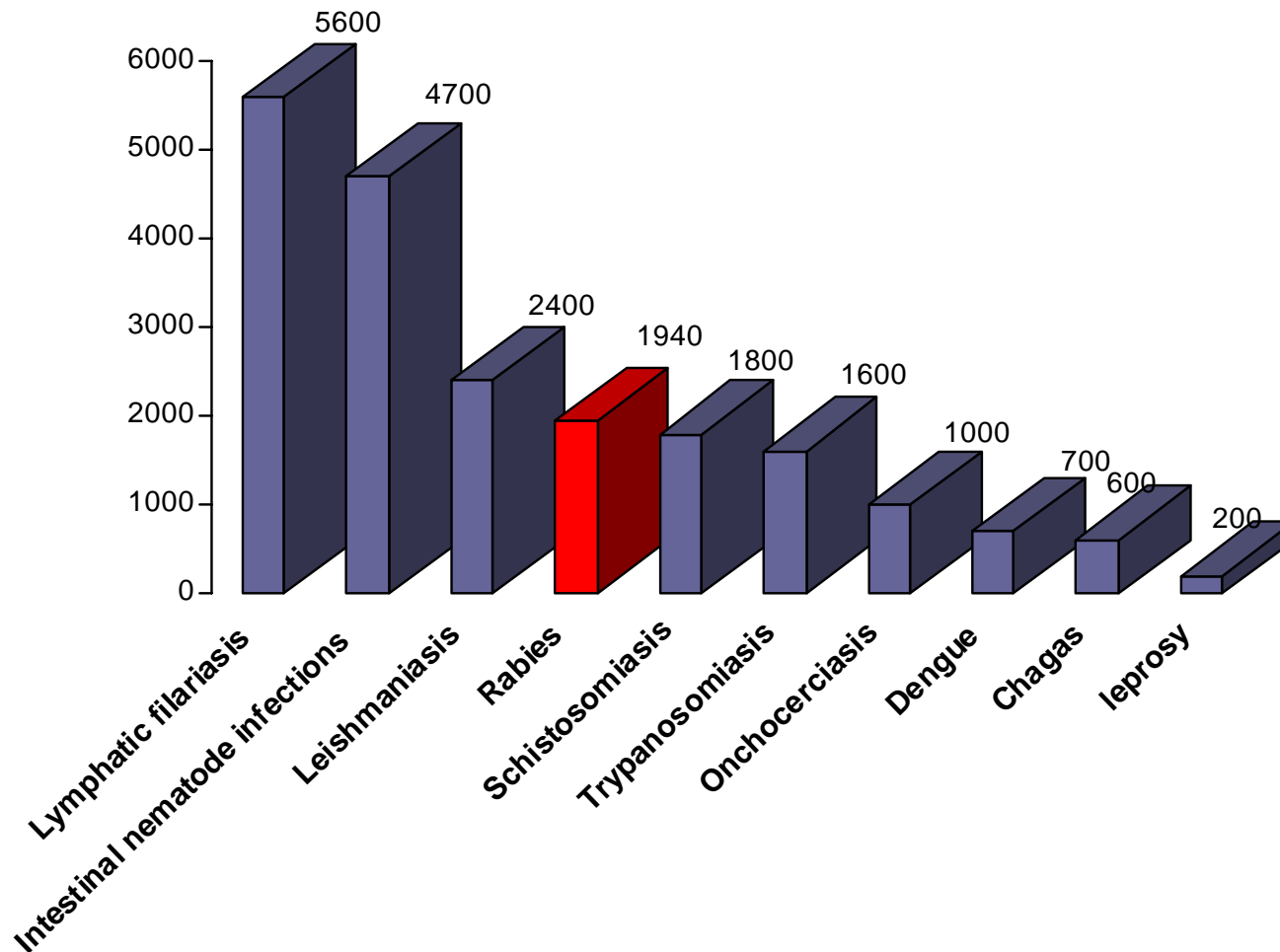
1,73 million -Africa:750,175, Asia: 975,796-  
(95% CI 408.000 - 3.360.000)

- DALY score (fear factor and NTV side effects):

0,21 million (Asia: 0,178)

\*Disability-adjusted life-years

# Ranking “Neglected Disease” burdens (DALYs x 1000)



# Health burden without interventions

Total predicted human rabies  
deaths without human PET:

330,304

(95% CI: 141 000 - 565 000)

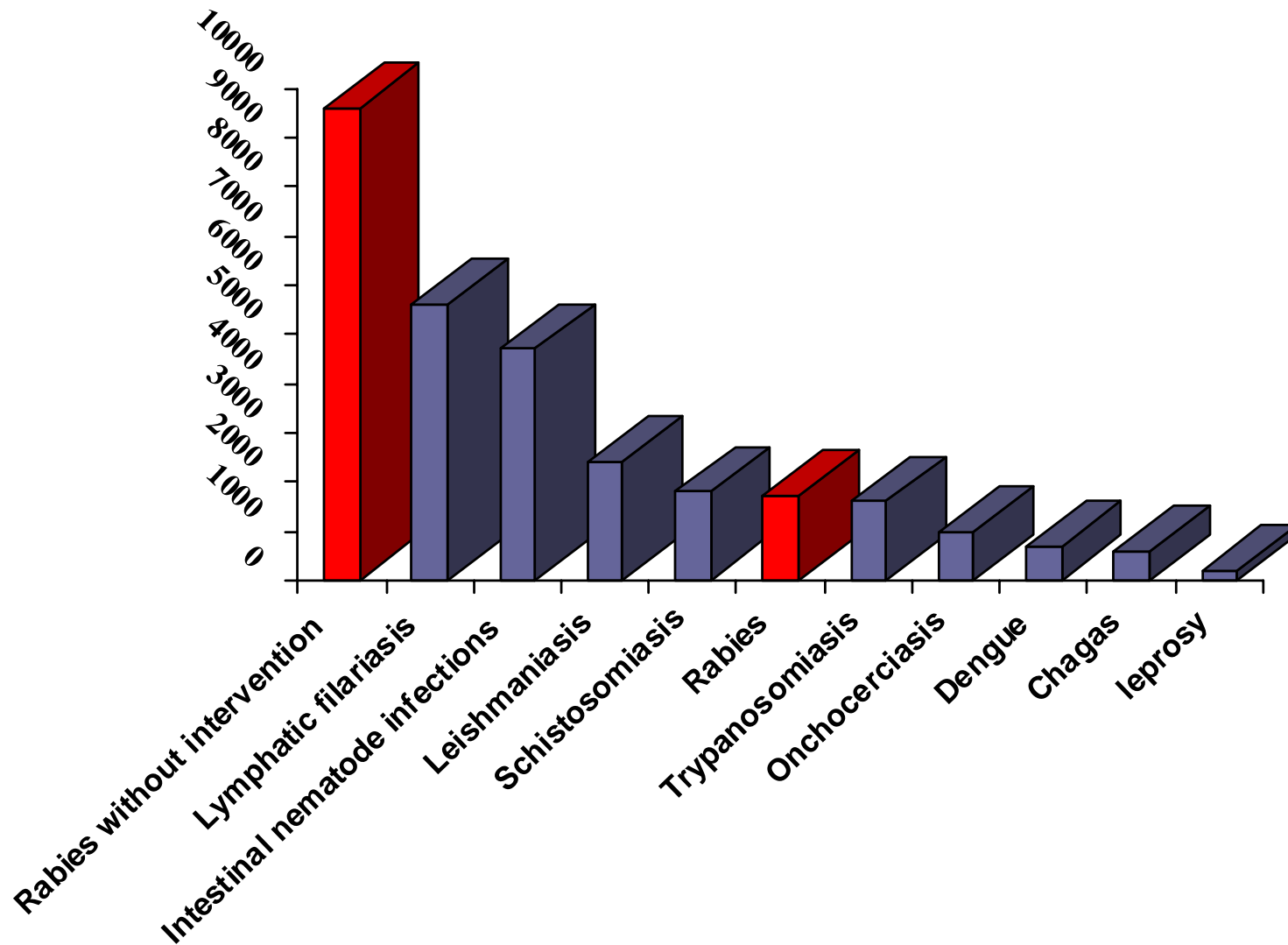
DALY score without intervention:

9.6 million

(95 %CI: 4.091.625 -16.370.517)



## Ranking “Neglected Disease” burdens (DALYs x 1000)



# Intersectoral National Rabies Control Programs in Asia

## without

Bangladesh

Bhutan

Cambodia

India

Indonesia

Mongolia

Myanmar

## with

✓ China

✓ Lao PDR

✓ Pakistan

✓ Philippines

✓ Nepal

✓ Sri Lanka

✓ Thailand

✓ Viet Nam

# Common Issues and Concerns

## Rabies in Asia

- Not a priority disease
- Insufficient surveillance systems
- Limited access to modern rabies vaccines and supply problems
- Inadequate resources due to lack of political support
- Lack of consensus on strategy
- Weak intersectoral coordination
- Lack of public awareness and cooperation

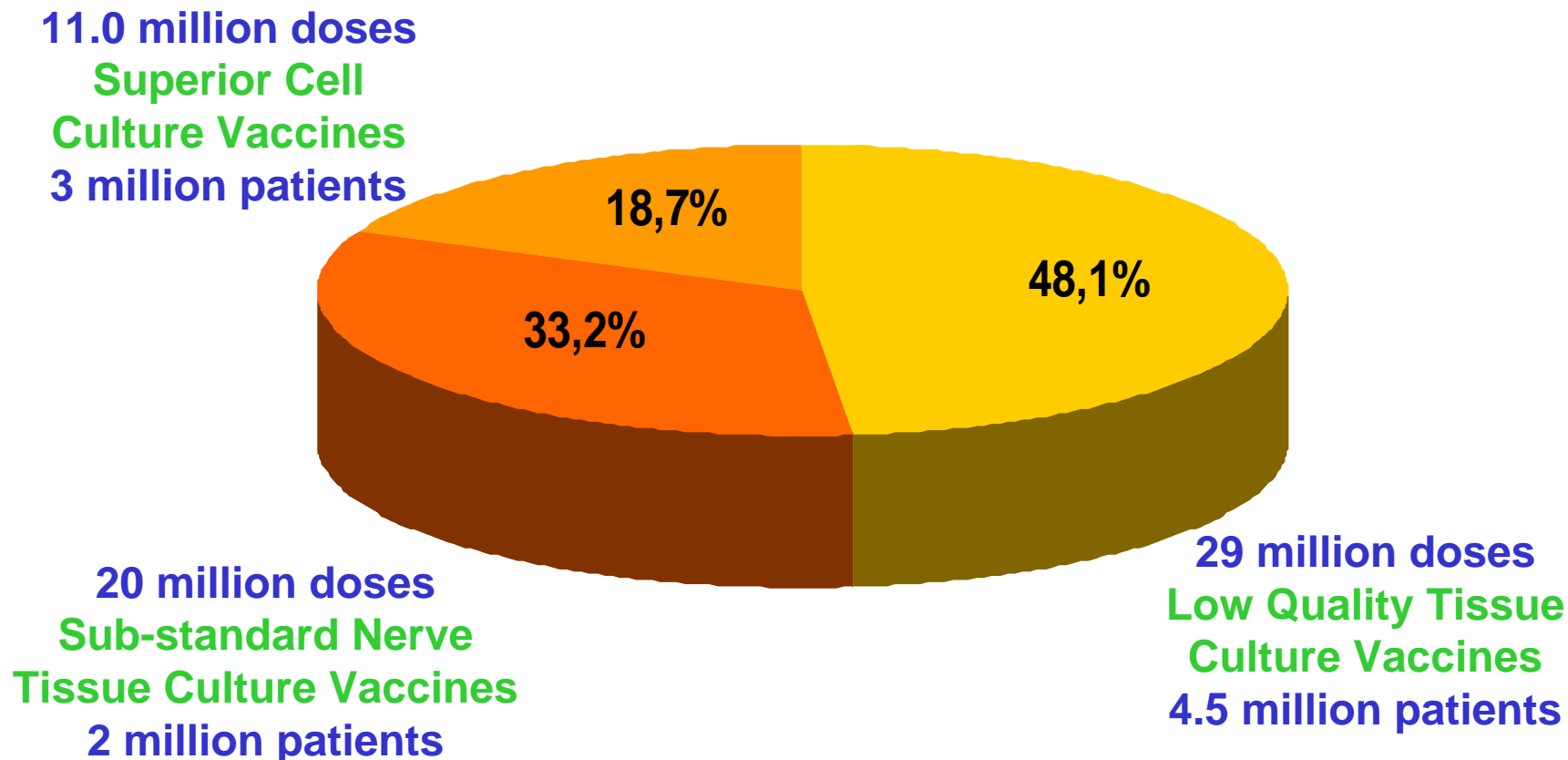
# Nervous tissue derived vaccines still used in Asia in 2005

- Bhutan
- ✓ Cambodia
- China
- India
- Indonesia
- Lao PDR
- ✓ Myanmar
- ✓ Nepal (phase out by Dec06)
- Philippines
- Sri Lanka
- Thailand
- ✓ Viet Nam





# Low quality vaccines are still used widely



**Low quality and sub-standard nerve tissue vaccines dominate the global market. Less than 20% are superior cell culture vaccines (CCV).**

# Rabies Control in Asia

## Opportunities

- Utilize models of successful rabies elimination programs (Japan, Taiwan, Malaysia)
- Utilize current safe and efficacious vaccines
- Increase the number of patients receiving post-exposure treatment
- Mobilize the support of civil society, private sector and government-sponsored initiatives
- Secure existing expertise on rabies/zoonoses

# Summary of WHO Expert Consultation on Rabies WHO, Geneva, October 2004

published as

WHO Technical Report Series No.931

World Health Organization



- Report of this Expert Consultation supersedes the report of the 8<sup>th</sup> Expert Committee on Rabies held in 1992.
- Recommendations of this Consultation update and replace those contained in the 8<sup>th</sup> Report of the ECR

## On vaccines

### the Consultation recommended that

- Production and use of all nerve tissue vaccines should be discontinued
- Only cell culture and purified embryonated eggs vaccines should be used in humans.
- Veterinary cell culture rabies vaccines should replace all nerve-tissue vaccines

## Vaccines for human use:

- Rabies vaccines for human use should meet WHO requirements for the production and control of such vaccines, as well as the requirements that apply to the production of rabies vaccines as published in WHO Technical Report Series.
- NIH remains reference potency test for batch release. Minimum: 2,5 IU/single intramuscular immunizing dose.
- Candidate vaccines should demonstrate their safety, immunogenicity and or efficacy for human use in appropriate clinical trials using a vaccine of known efficacy as control and same WHO recommended PEP regimens.

# Immunoglobulin

- Most of the new ERIGs are potent, highly purified, safe and considerably less expensive than HRIG
- However, a skin test should be conducted prior to administration of ERIG and F(ab')<sub>2</sub> products according to the guidelines of the manufacturer



## Post-exposure prophylaxis

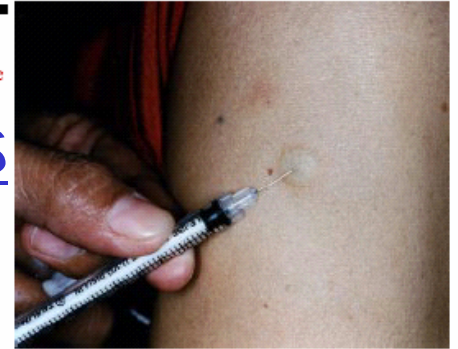
- All humans potentially exposed to rabies should receive prompt and thorough wound cleansing and antisepsis.
- This should be followed by passive immunization and a complete vaccine series using a potent and effective vaccine that meets WHO criteria applied using WHO regimens (2 IM, 2 IDs)
- Strict adherence to the WHO-recommended guidelines for optimal post-exposure rabies prophylaxis virtually guarantees protection from the disease.

# Post-exposure prophylaxis

- 3 Categories of contact:
  - No exposure/category I: no treatment
  - Minor exposure/ category II : vaccine only
  - Severe exposure/ category III: vaccine and  
RIG
- Bat contact under category III

# Intradermal immunization for pre and post-exposure prophylaxis

Injecting vaccine  
intradermally  
against resistance



- Unique ID dose for WHO recommended multidose intradermal Pre and Post EP regimens is 0,1 mL per id site
- Intradermal Post EP only with WHO recommended vaccines (PCECV Chiron, PVRV Aventis, HDCV from both companies).

## Recommendations for safe clinical management of rabies patients

- The care of humans diagnosed with rabies often creates great anxiety in a hospital setting, involving not only medical and nursing staff but the media and the public.
- Pre-exposure immunization against rabies of nursing staff and health-care personnel in hospitals may be provided to those who, after careful investigation, are considered most at risk.
- However the need to strictly adhere to proper barrier nursing methods for patient care, should be emphasized as equally if not more important in caring for rabies patients.

## Postmortem management of bodies of patients who have died of rabies

- When performing necropsies wearing protective clothing, goggles, a face mask and thick gloves should provide sufficient protection. Instruments must be autoclaved or boiled after use.
- Early disposal of the body by cremation or burial is recommended. Embalming should be discouraged.

## Dog rabies control the Consultation:



- Stated that mass immunisation: the most important single measure
- Recommended the use as a complementary measure of oral vaccines in dogs

# Dog population management the Consultation:

- Acknowledged the increasing number of animal birth control programmes (capture, neuter, vaccinate, release) and the encouraging results obtained
- Reiterated that indiscriminate mass dog culling is ineffective for dog rabies control



# Too many needlessly die of rabies in Asia



**EVERY ONE OF THESE DEATHS CAN BE PREVENTED**